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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

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Applicant's or agent's file reference HL81520/021/ACC		FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/EP 03/05880	International filing date (day/month/year) 04.06.2003	Priority date (day/month/year) 17.07.2002	
International Patent Classification (IPC) or both national classification and IPC H04L25/03			
Applicant TELEFONAKTIEBOLAGET LM ERICSSON (PUBL) et al.			


- This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
- This REPORT consists of a total of 5 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the opinion
- II ☐ Priority
- III ☒ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☐ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 11.02.2004	Date of completion of this report 16.08.2004
Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer Scriven, P Telephone No. +31 70 340-2718



**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/EP 03/05880

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-15 as originally filed

Claims, Numbers

1-10 as originally filed

Drawings, Sheets

1/3-3/3 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

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**INTERNATIONAL PRELIMINARY
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International application No. PCT/EP 03/05880

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

☒ the entire international application,

☐ claims Nos.

because:

☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (specify):

☒ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):

see separate sheet

☒ the claims, or said claims Nos. 1, 8-10 are so inadequately supported by the description that no meaningful opinion could be formed.

☐ no international search report has been established for the said claims Nos.

2. A meaningful international preliminary examination cannot be carried out due to the failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions:

☐ the written form has not been furnished or does not comply with the Standard.

☐ the computer readable form has not been furnished or does not comply with the Standard.

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Re Item III

Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

- 1** The application fails to meet the requirements of **Article 5 PCT**, because it does not provide the skilled reader with sufficient information to implement the invention as defined by the claims.
- a** Each claim defines a step (in the method claims) or means (in the apparatus claims) for estimating the noise of a channel. The application, however, does not provide the skilled reader with a method of making such an estimation. The single embodiment specifies only that the *noise power spectrum* ρ is estimated (page 11, lines 18-20).
- i** The description defines the feature of setting of a prefilter by means of band symmetric factorisation as essential to the invention. This means, that it is necessary to obtain a positive-definite band matrix, and only one way of obtaining this is described, namely by adding the estimated noise to the calculated power spectrum.
- ii** It follows that the step of estimating the noise is essential, and any claim which does not define this step would lack support from the description (Article 6 PCT).
- iii** The step of estimating the noise cannot, then, be removed from the claims.
- b** Each claim defines a step (in the method claims) or means (in the apparatus claims) for deriving the spectral factorisation of a matrix. They note that this is distinct from the approximation of the spectral factorisation, which is performed in further steps or means. The description, however, while it gives an example of how the approximate factorisation may be derived (page 8, lines 8-10; page 12, lines 16-20), does not show how the spectral factorisation itself may be derived. Thus, the application does not contain sufficient information to allow that implementation of this step or of the corresponding means.
- c** As for the step or means of approximating the spectral factorisation, the description gives only one example of how this may be done, namely by reversing the non-zero elements of the last row of the decomposed lower triangular matrix (page 8, lines 8-10; page 12, last line). It is not evident how an element of the matrix may be reversed. Such an element is a complex number, and the operation of reversal of complex numbers is not one with which the skilled reader is familiar.

- i Further, it is not clear which elements of the last row are non-zero. Certainly the first $k-m$ elements are always zero, but there is no reason to suppose that none of the other elements can never be zero.
 - ii The final equation on page 12 does not serve clearly to define g (which is the spectral factor: see page 13, lines 12-14). The function *flip* is nowhere defined, and the meanings of its arguments are not given. It is noted that the quantities L , k and m are defined, but their roles in the equation are not specified. It seems from page 13, lines 8-12, that g must be a polynomial, rather than a vector.
 - iii Clarification of the meaning of *flip* or of *spectral factorisation*, would go beyond the disclosure in the international application as filed (Article 34(2)(B) PCT). Further, since it is stated, that, in order to achieve the stated effect, the approximation of the spectral factorisation is essential (page 7, line 25 - page 8, line 1), it is not possible to remove the feature from the claimed subject matter, without inducing an objection under Article 6 EPC, due to lack of support.
- 2 The application fails to meet the requirements of the **Article 6 EPC**, because **claims 1 and 8-10 are not supported by the description.**
 - a The description defines the following features as essential, and so provides support only for those claims which include all these features.
 - i The setting of a prefilter by means of band symmetric factorisation (page 7, lines 4-5);
 - ii the approximation of the spectral factorisation (page 7, line 25 - page 8, line 1);
 - iii estimation of the noise (page 7, line 25 - page 8, line 1);
 - iv direct polynomial division of the estimated noise autocorrelation (page 8, lines 17-20).
 - b Claim 1 defines a method which does not contain feature **iv**, and claims 8-10 define apparatuses which do not implement it.